

**Residential On-Site  
Sewage Systems:  
Installer Certification Exam Review**  
*Rule 410 IAC 6-8.3*  
*(revised and republished on May 9, 2014)*  
***IOWPA - February 17-18, 2021***

Indiana State Department of Health

Environmental Public Health Division

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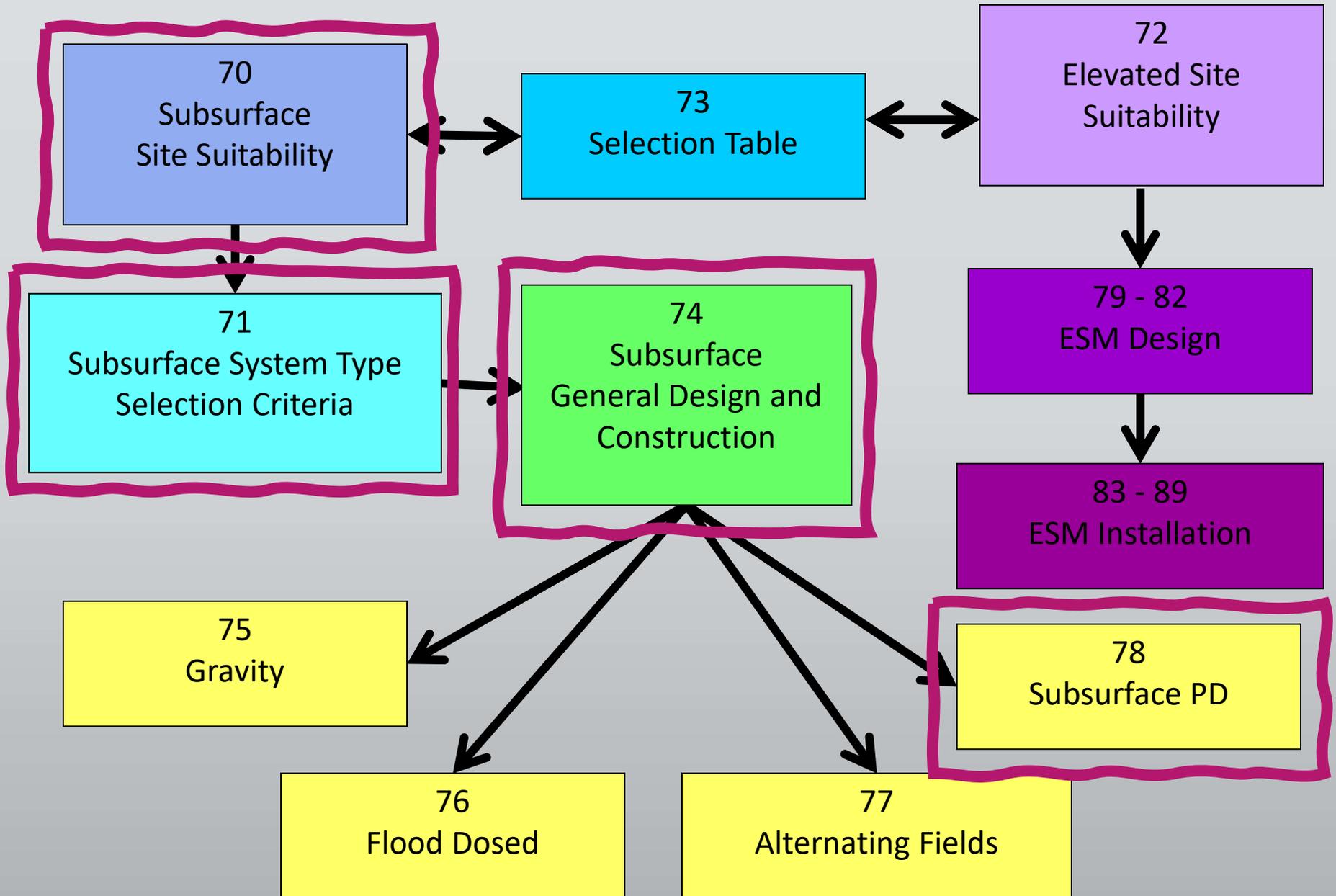
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Indiana State  
Department of Health

# Sections 70-89



## Section 78

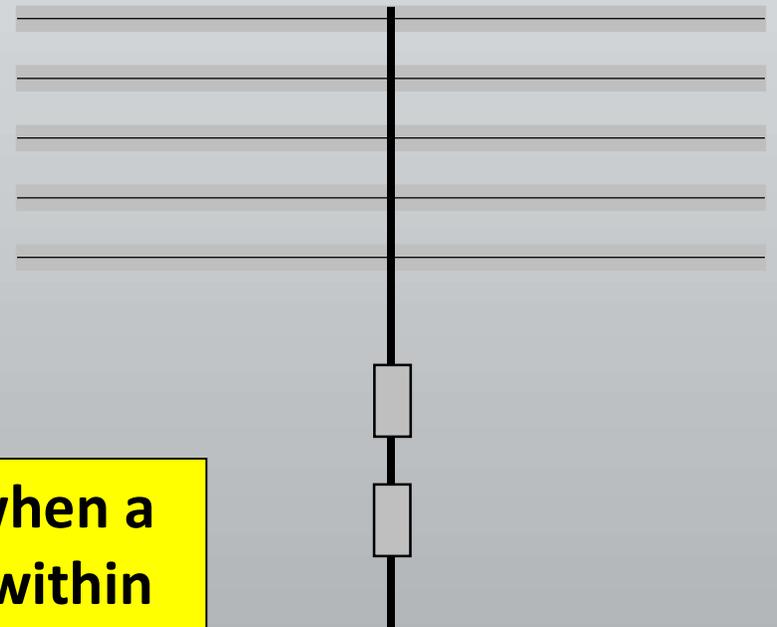
### Subsurface Pressure Distribution OSS

#### Design and Construction

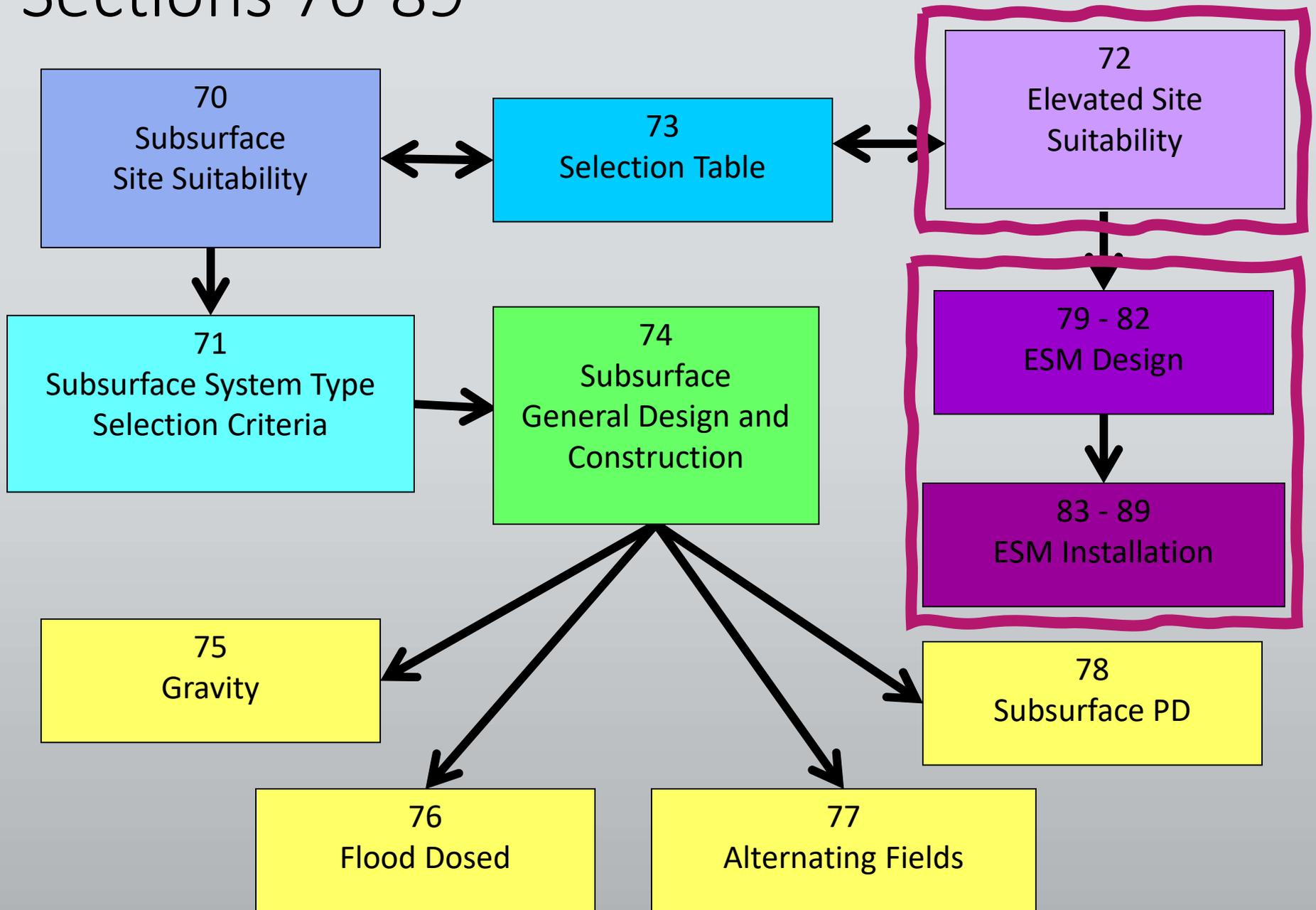
- (a) Section 74 and this Section
- (b) Manifold
- (c) Residual head **(2.5' – 3')**
- (d) Effluent pump
- (e) Force main
- (f) Dose Tank
- (g) - (h) Design

**Dose Volume and hole placement varies with soil loading rates.**

**Pressure Distribution must be used when a soil loading rate of 1.20 gpd/sq. ft is within 24" of the trench bottom.**



# Sections 70-89



# Section 72 - Elevated Sand Mound Site Suitability

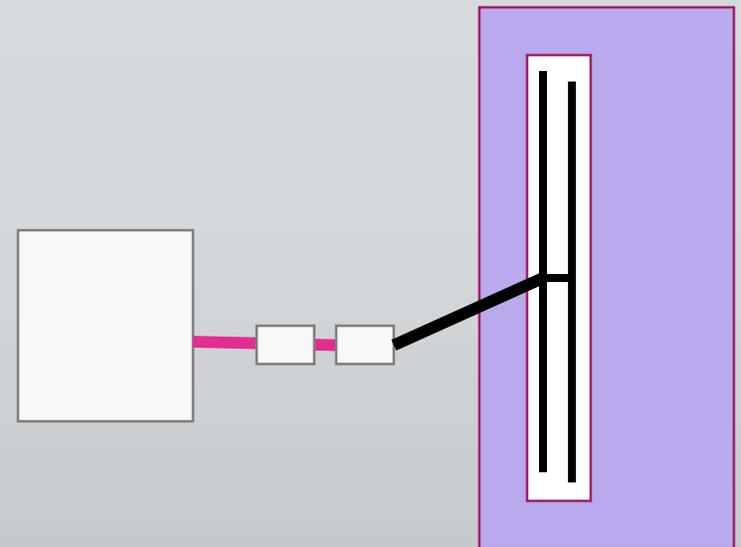
(a) Site evaluation, soil evaluation, DDF

(b) Site conditions

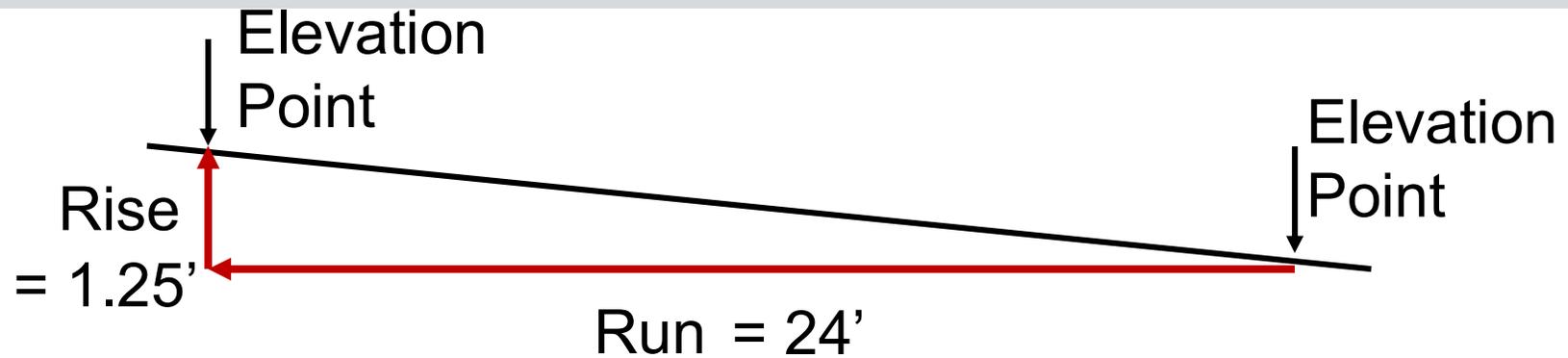
1. Sufficient area
2. Topographic position
3. Site slope  $\leq 6\%$
4. SHWT  $\geq 20''$
- 5-7. Limiting Layer  $\geq 20''$

below grade and  $0.25 \leq \text{SLR} \leq 1.20 \text{ gpd/ft}^2$

(c) Drainage way, RFE, runoff, ponding



# Calculating Slope

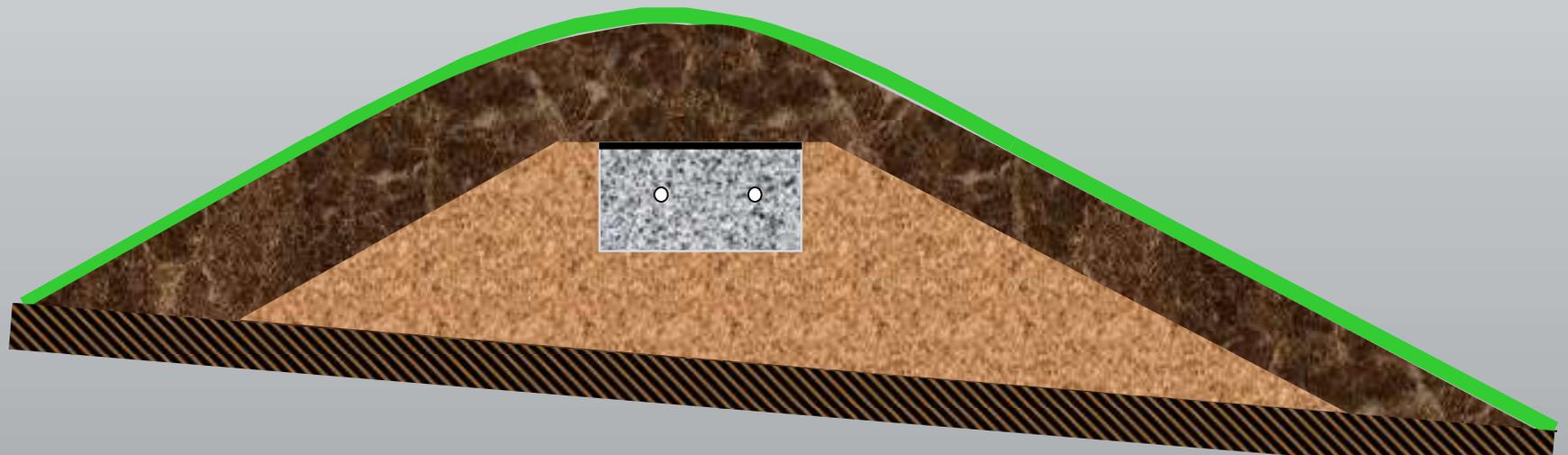


$$\text{Percent Slope} = \text{Rise} \div \text{Run} \times 100$$

$$1.25' \div 24' \times 100 = 5.2\%$$

# Section 79-89 Elevated Sand Mound

- Tilled ground surface
- INDOT Spec. 23 sand
- Aggregate Bed
- Pressure network
- Barrier material
- Soil cover
- Vegetative cover

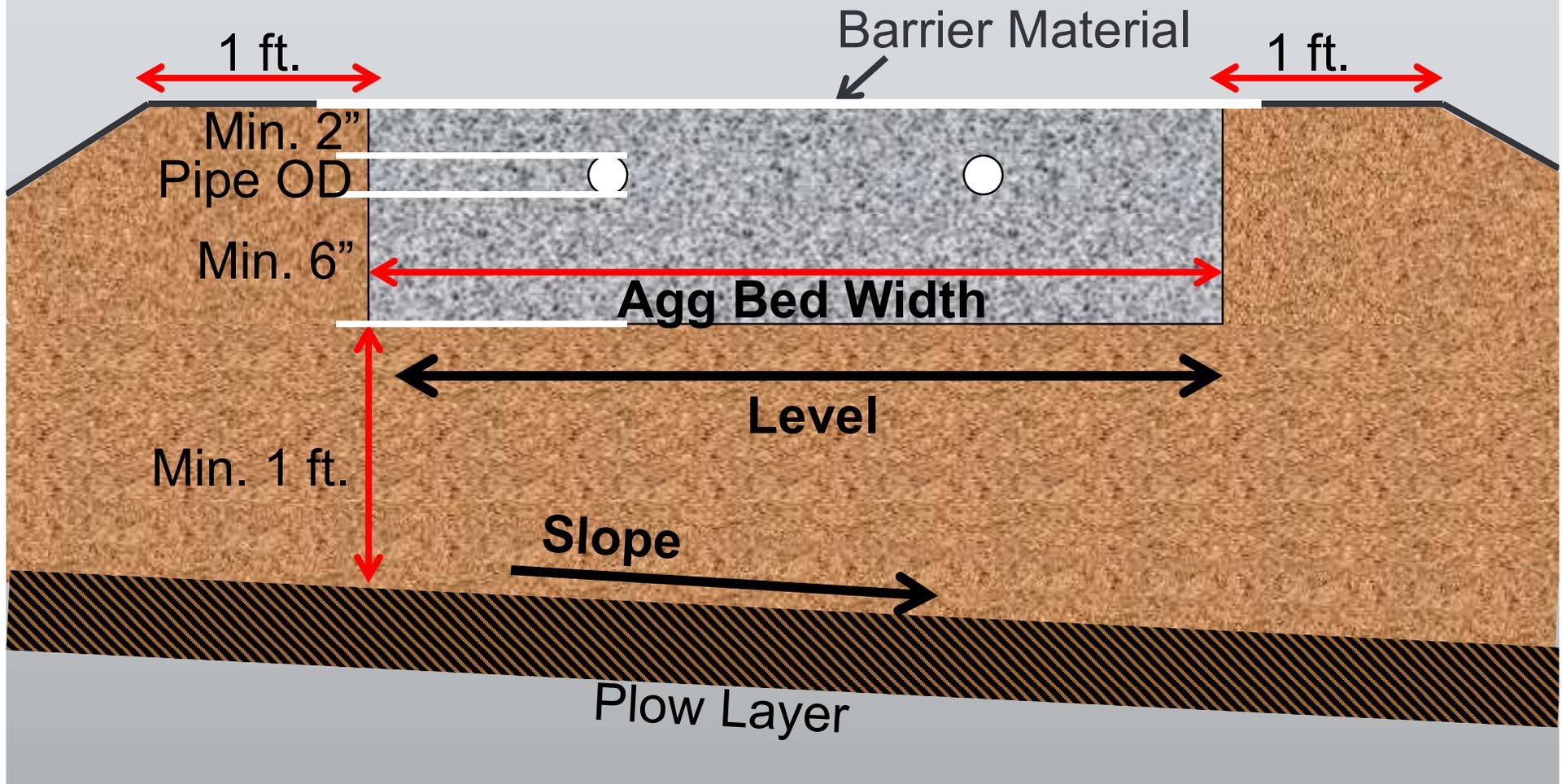


# Aggregate Bed

- Contour, Contour, Contour!
- Size of Aggregate Bed
  - Area
  - **Maximum** Aggregate Bed Width
    - Min. Width = 4'
    - Max. Width = 10', 15' or 20'
  - Length
- Geometry – Long and narrow is best!
- Bottom of aggregate bed must be level along its **length** and **width**.

# Aggregate Bed

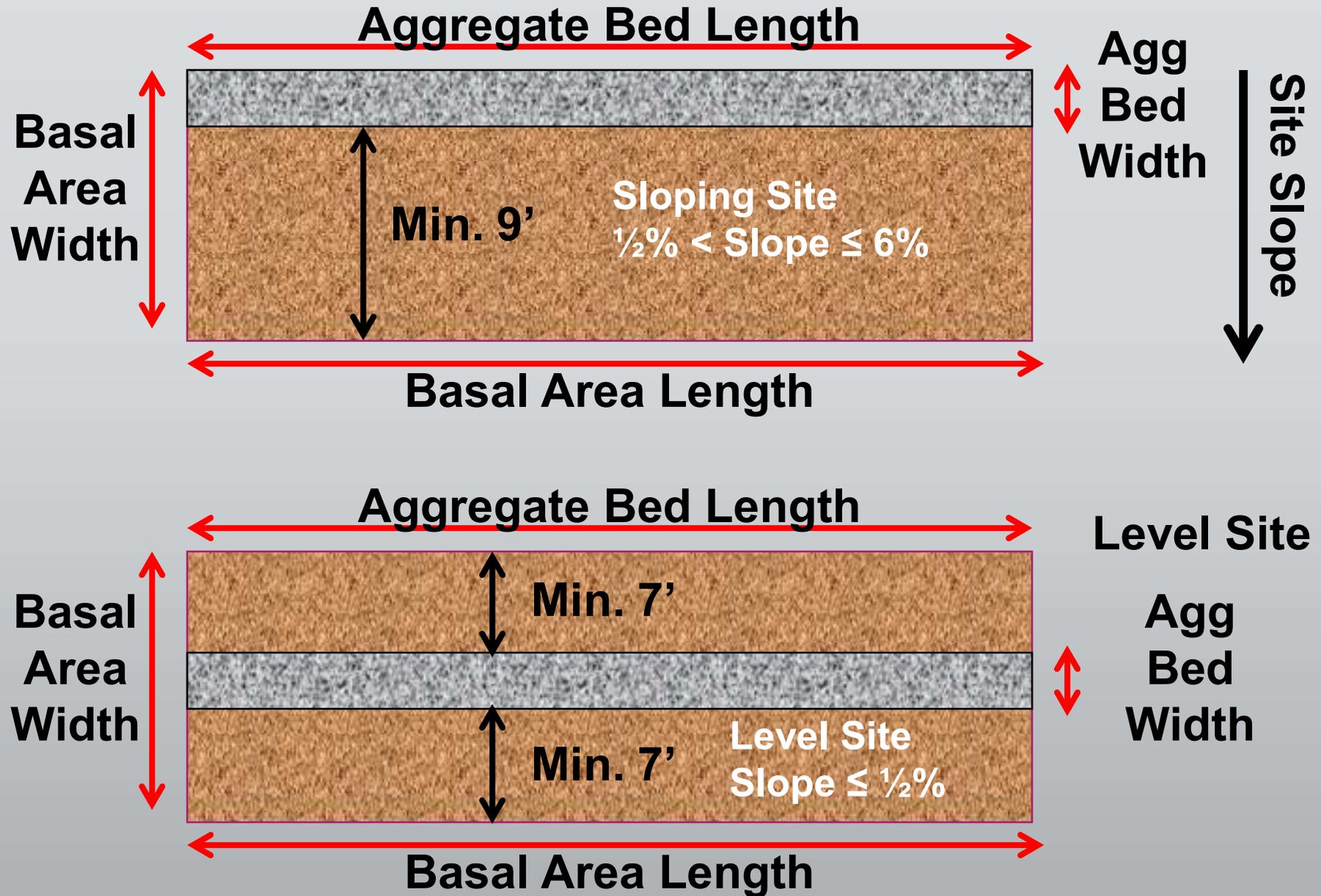
Aggregate Bed level from side to side and end to end.



# Basal Area

- Contour, Contour, Contour!
- Size of Basal Area
  - Area
  - Length = Length of the Aggregate Bed
  - Width
    - Minimum Basal Area Width
      - Agg Bed Width + 14' for level site
      - Agg Bed Width + 9' for sloping site

# Basal Area / Aggregate Bed Location



# ESM Pressure Distribution Network

- Effluent Pump

- TDH = Static Head + Friction Loss + 3.0' (residual head)

- Dose Volume = **1/4 DDF** + Drainback (if any)

- Effluent Force Main

- Approach to ESM

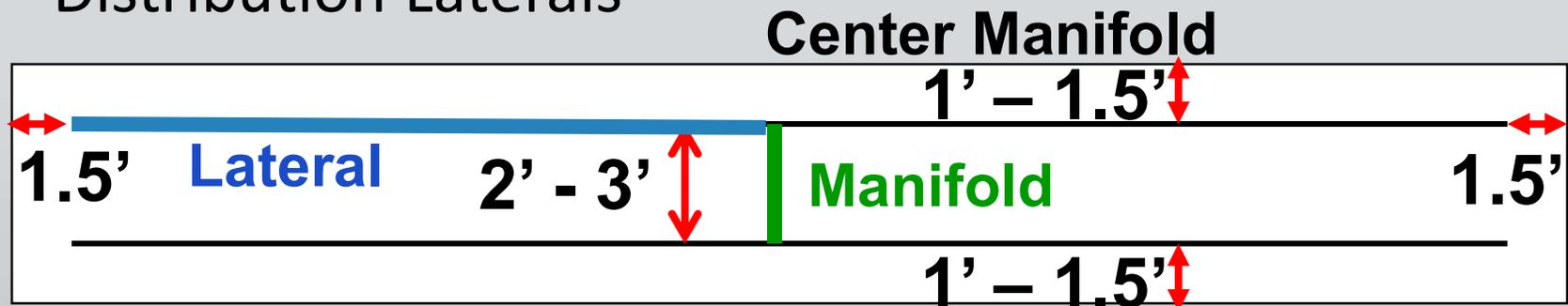
- On level sites (slope  $\leq 1/2\%$ ), from either end of the ESM

- On sloping sites ( $1/2\% < \text{slope} \leq 6\%$ ), from the upslope side.

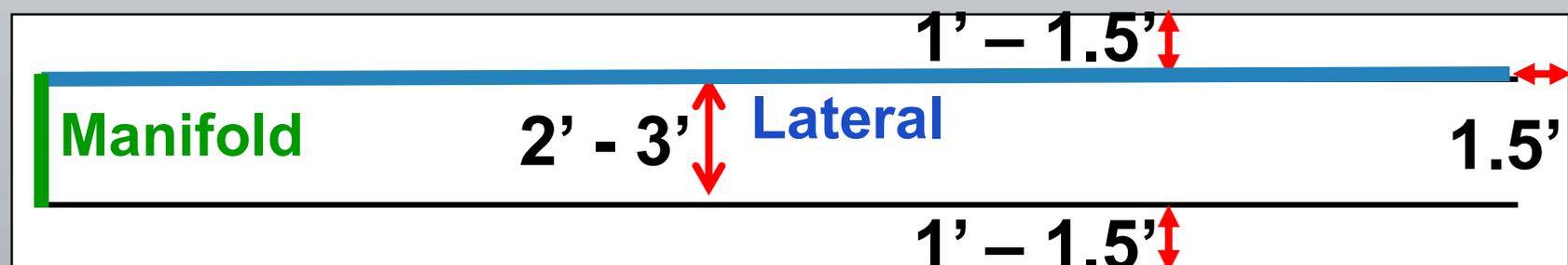
- Diameter = 1½" – 4"

# Manifold / PD Laterals

- Manifold
  - DDF  $\leq$  750 gpd, manifold is 2"
  - DDF  $>$  750 gpd, manifold is 2" or the same size as the effluent force main, whichever is greater
  - Maximum 4"
- Distribution Laterals



## End Manifold

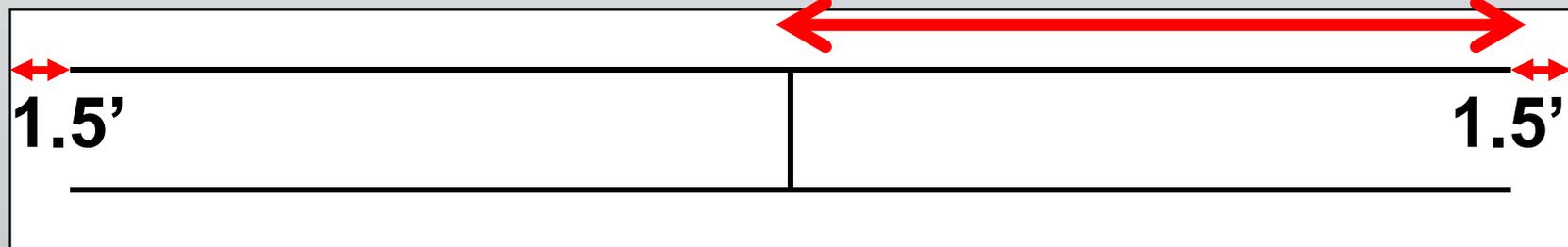


Plan View

# ESM Pressure Distribution Network

## Pressure Distribution Laterals

$$\text{Length} = \frac{\text{Agg Bed Length} - 3}{2}$$



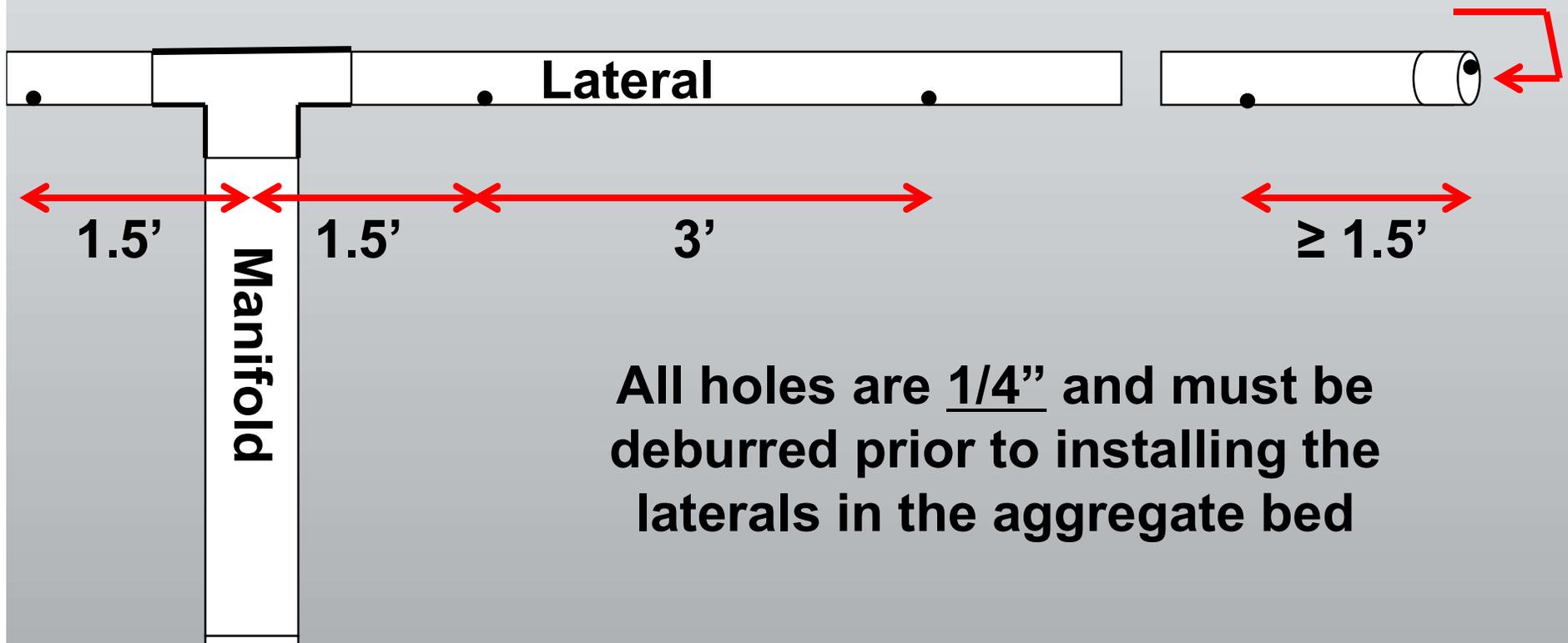
Diameter – dependent upon lateral length

Lateral Length	$L \leq 25'$	$25' < L \leq 40'$	$40' < L \leq 55'$
Lateral Diameter	1 inch	1 ¼ inch	1 ½ inch

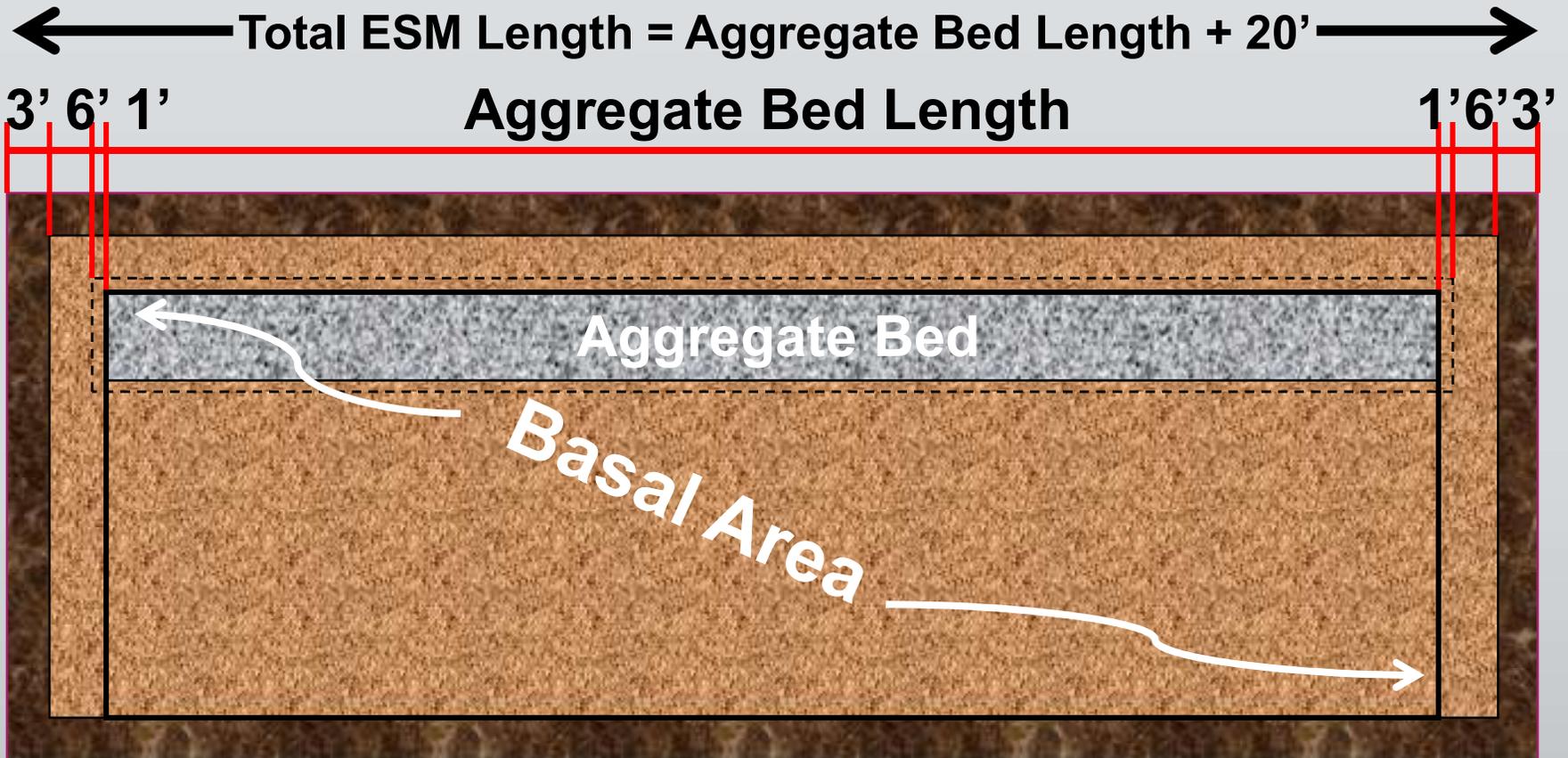
# ESM Pressure Distribution Network

## Hole Placement

- 1<sup>st</sup> hole is 1.5' from center of manifold
- 3' on center
- Last hole is at least 1.5' from hole in endcap
- Hole in upper half of vertical face of the endcap.



# ESM Dimensions

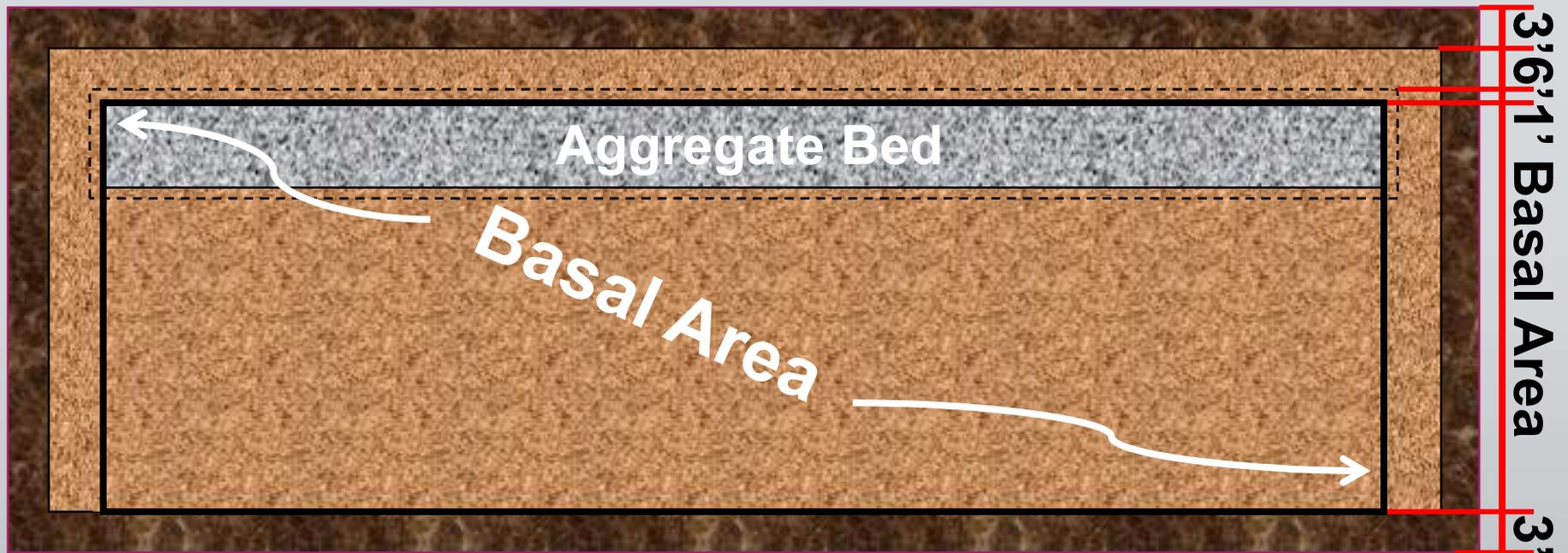


- 1' Sand Border Surrounding Aggregate Bed
- 6' sand on both ends and on upslope side
- 3' Soil cap on both ends and both sides

**Sloping Site**

# ESM Dimensions

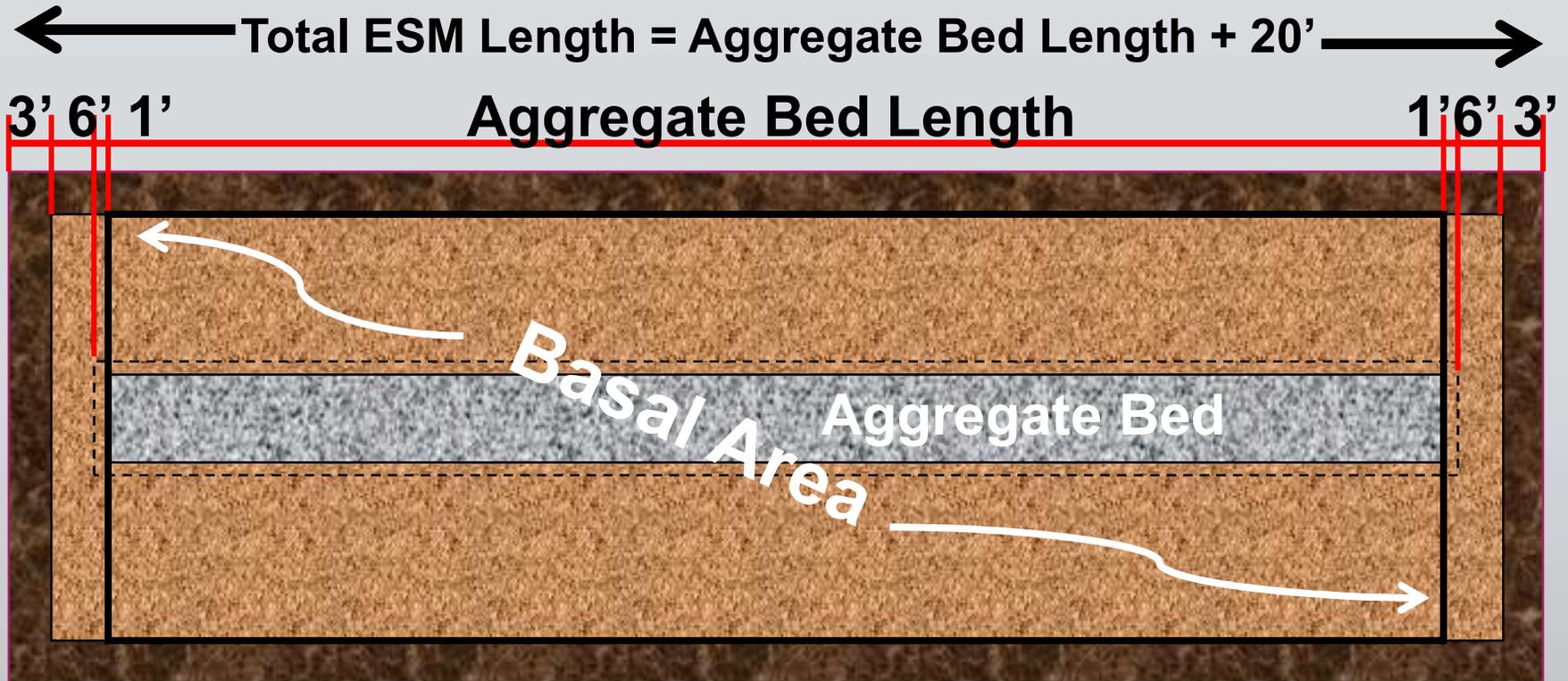
**Total ESM Width = Basal Area Width + 13'**



- 1' Sand Border Surrounding Aggregate Bed**
- 6' sand on both ends and on upslope side**
- 3' Soil cap on both ends and both sides**

**Sloping Site**

# ESM Dimensions



**1' Sand Border Surrounding Aggregate Bed**

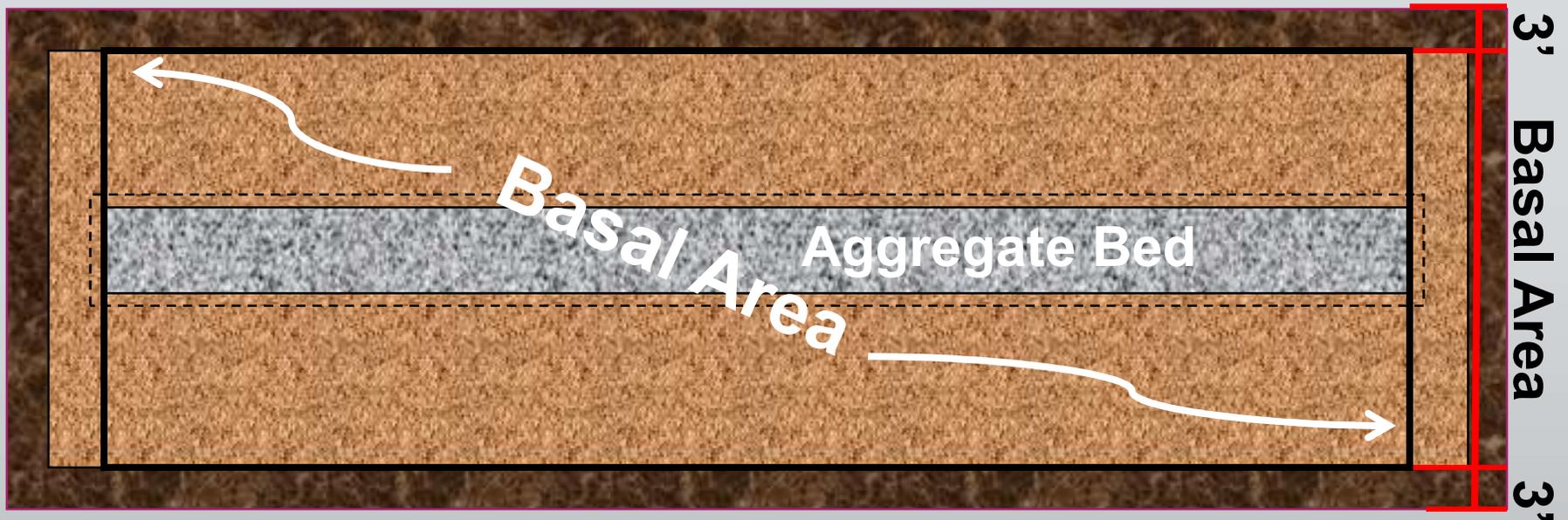
**6' sand on both ends**

**3' Soil cap on both ends and both sides**

**Level Site**

# ESM Dimensions

$$\text{Total ESM Width} = \text{Basal Area Width} + 6'$$



**1' Sand Border Surrounding Aggregate Bed**

**6' sand on both ends**

**3' Soil cap on both ends and both sides**

**Level Site**

# Section 83

## ESM Installation

### a) Stake out and protect the site

- Soil absorption field
- Dispersal area
- Drainage
- Set aside area (if required)
- Future expansion area (if required)

### b) Prevent traffic



# Section 84

## Requirements for construction

a) Site prep, tilling, construction, finish grading and stabilization

1) In accordance with plan

2) Not when soil is frozen

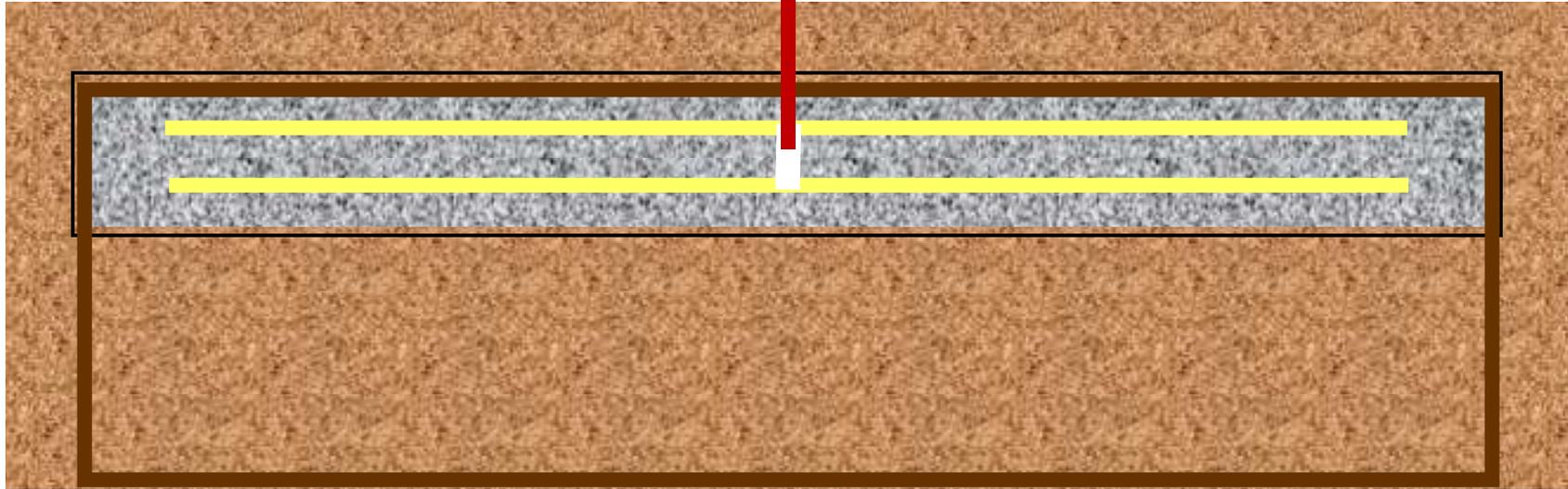
b) Soil plasticity



Section 85  
Installation of force main

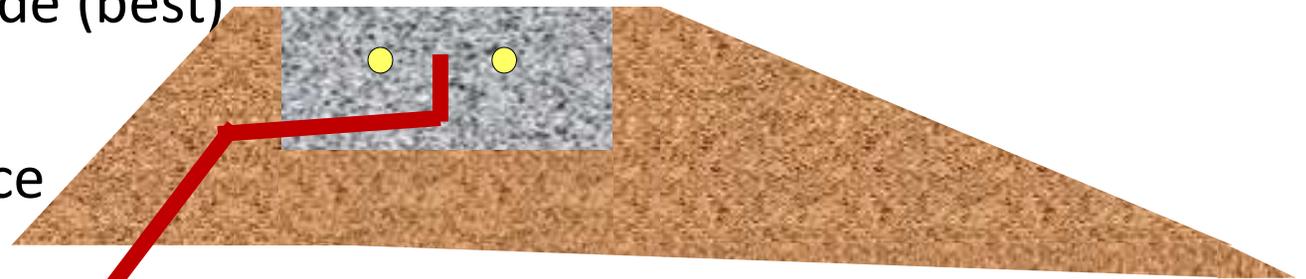
**Install effluent force main from  
dosing tank**

# Elevated Sand Mound Design



## Effluent Force Main Approach

- From the upslope side (best)
- From either end
- Minimize disturbance to basal area

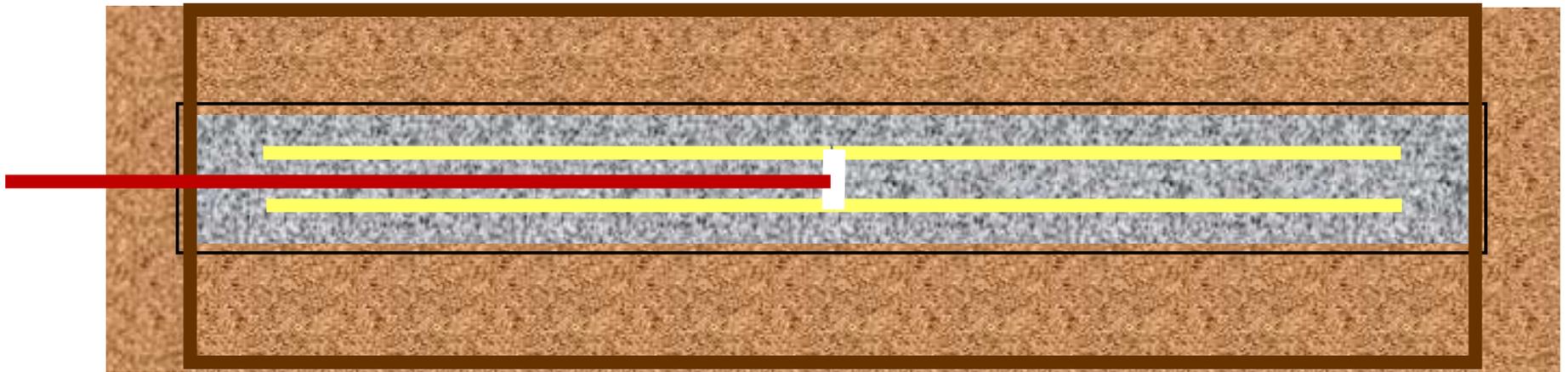


**Effluent force main diameter**

**1 ½" – 4"**

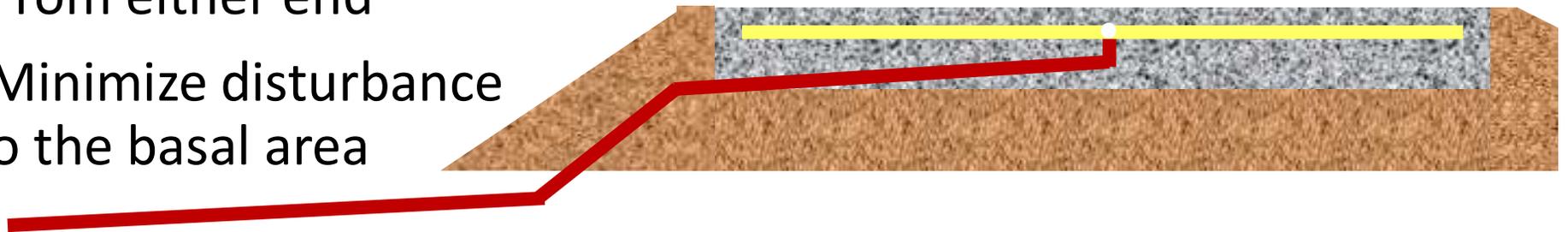
**Sloping Site**

# Elevated Sand Mound Design



## Effluent Force Main Approach

- From either end
- Minimize disturbance to the basal area



Effluent force main diameter  
 $1\frac{1}{2}'' - 4''$

**Level Site**

**Effluent force  
main  
installed to  
point of  
connection to  
manifold and  
temporarily  
capped**



## Section 85

### Installation of force main

#### c) If installed after plowing

- 1) hand dig through Spec 23 sand
- 2) Prevent dirt, sand and debris from entering force main
- 3) Bed and stabilize force main installed in Spec 23 sand

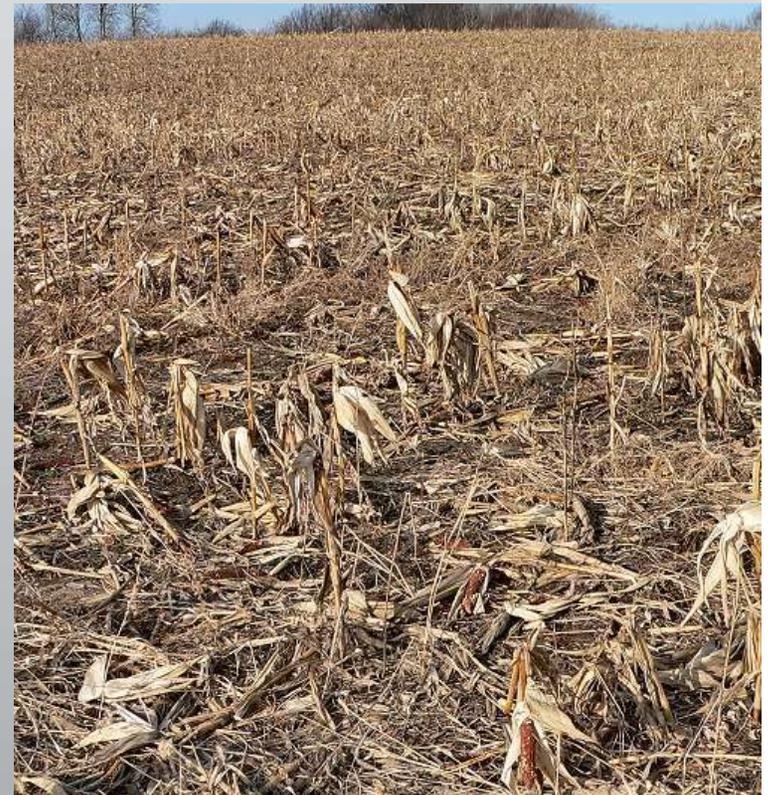
# Section 86

## Site Preparation

### a) Preparing the site

#### 1) Cut and remove excessive vegetation at the site

- Don't scrape the site
- Cut vegetation must be removed from the site.



# Section 86 Site Preparation

## a) Preparing the site Tree removal

- 2) Cut at ground surface and remove
- 3) Roots that protrude must be cut and removed without causing compaction



# Section 86

## Site Preparation

### (a)(4) Plowing of site

- Along the contour
- 7-14" or 2" below compaction
- Chisel plow or bulldozer with ripper along the contour
- Moldboard plow
  - At least 2 bottoms
  - 1 pass along the contour of the site
  - Furrows turned upslope on sites with slope  $>1/2\%$



## Section 86

### Site Preparation

#### (4)(b) Plowing of site using a backhoe with chisel teeth

- Wooded sites & sites that limit the use of large equipment
- **Approved in writing by the department or LHD**
- Till along the contour of the site
- Till with chisel teeth on the backhoe bucket
- Backhoe remains on untilled soil



## Section 87 Placement of Sand

**a) Apply INDOT Spec 23  
sand and keep at least 6”  
below tires/tracks**

**b) Immediately after  
plowing**





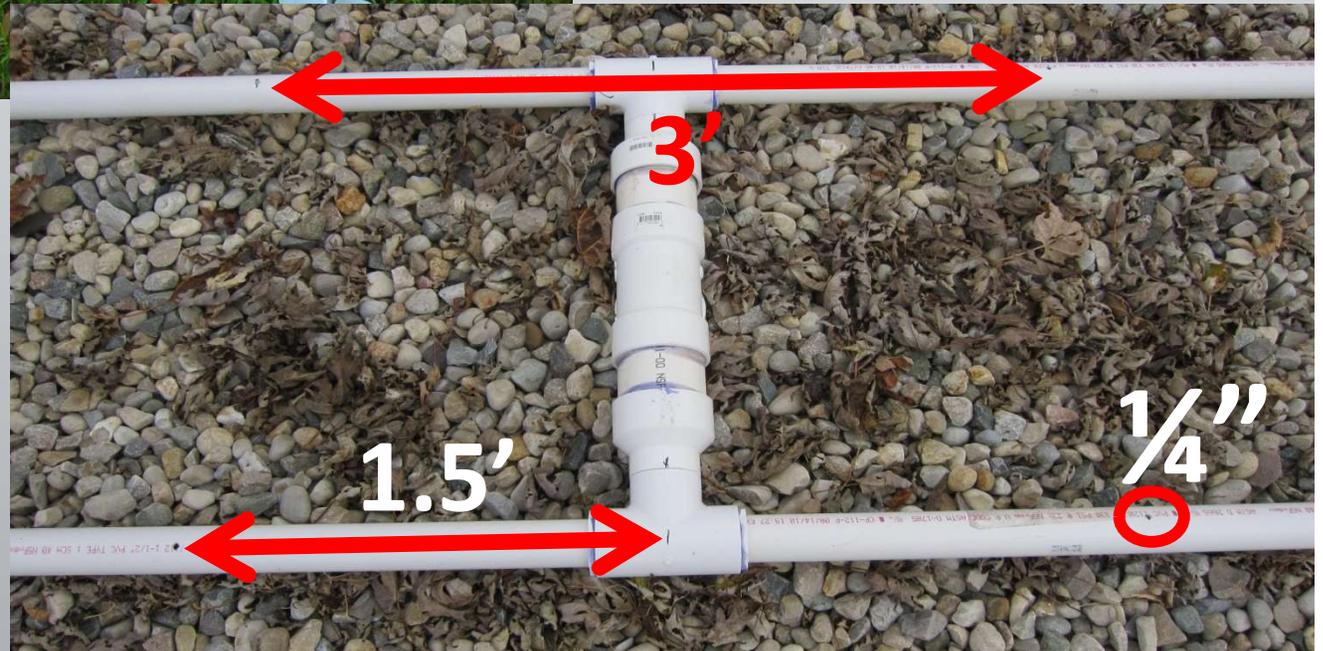
## Construct Aggregate Bed



Assemble manifold and distribution laterals



Manifold diameter  
2" - 4"





**Check residual  
pressure.  
3' required.**

**Complete aggregate bed. Min. 2” aggregate on top of distribution laterals.**





01/02/2003

**Finish aggregate bed and apply barrier material.**



**Barrier material covers aggregate bed from side to side and end to end.**



**Sand must be free of ruts**



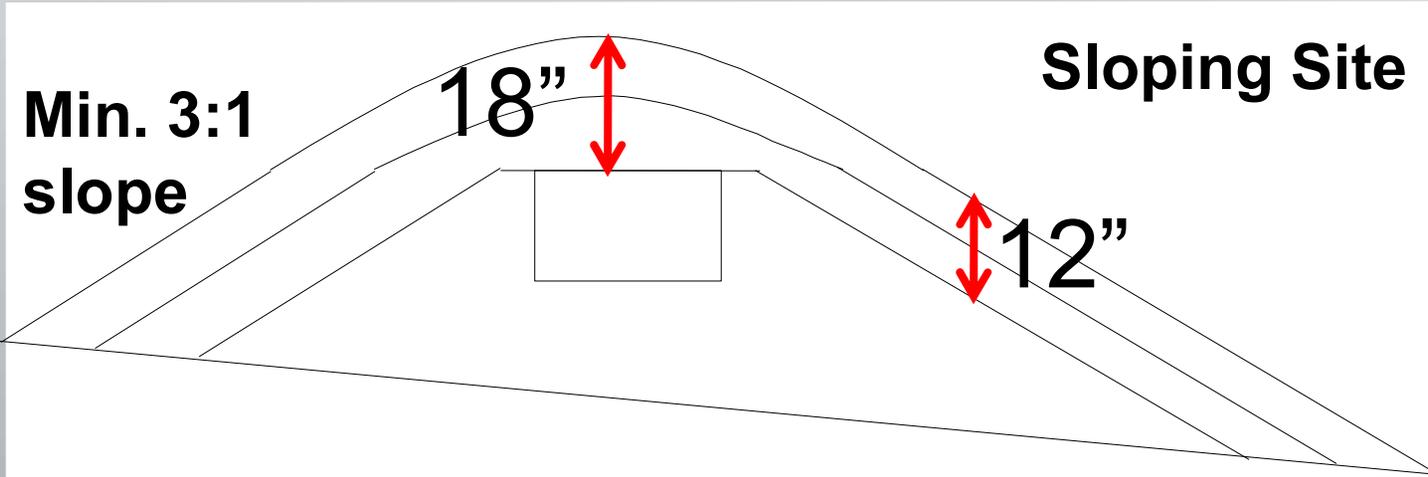
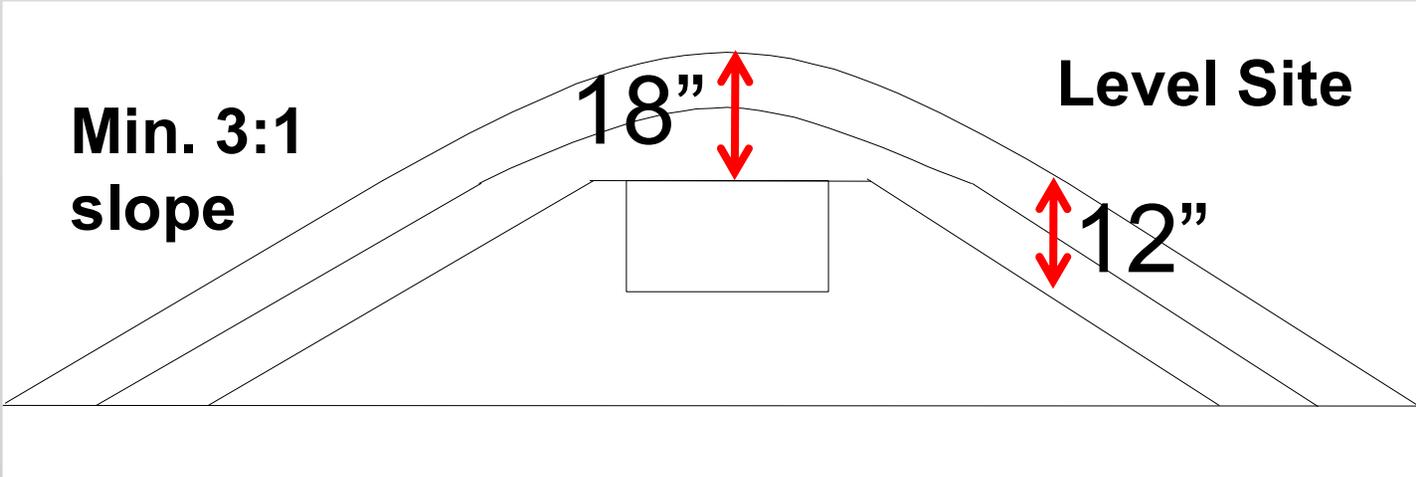
**Cover with soil cover material.**



**Min. 12" cover soil over mound  
with min. 18" over aggregate  
bed to crown the mound.**



# ESM Installation





**Seed or straw mound.**



**Seed or straw mound.**

**01/01/2003**

# Question 6

## 6. On a sloping site ( $\geq 1/2\%$ and $\leq 6\%$ ) what is the optimal way to install the effluent force main?

- A. With as little disturbance to the basal area as possible.
- B. It does not really matter.
- C. From the high (upslope) side of the system.
- D. From the downslope edge of the mound.
- E. Both A and C.

## Section 90 - Abandonment of OSS

### a) When use of OSS is discontinued

- 1) Electrical power disconnected
- 2) Above ground electrical removed, if not reused
- 3) Licensed septic tank cleaner to pump
- 4) Tanks
  - A) Removed or lids crushed, backfilled
  - B) Filled with flowable fill
- 5) Grade and establish vegetative cover

# Section 90 - Abandonment of OSS

- b) Component of SAS may be left intact, vegetative cover maintained
- c) Cover surfacing effluent with hydrated lime, top soil & vegetative cover
- d) If components to be removed
  - 1) Wastehauler must pump contents
  - 2) Drying time
  - 3) Remove distribution network, aggregate and sand
  - 4) Dispose at licensed landfill
  - 5) Grade and vegetative cover
- e) Written documentation of tank abandonment provided to LHD

# Discussion/Questions

## Exam is:

- An individual evaluation
- Multiple Choice & True-False question format
- 3-tiered exam
  - A – Septic Tanks, Gravity, Drainage (100 Q)
  - B - Pump Assisted (40 Q)
  - C - Elevated Sand Mounds (40 Q)
- Open Rule / Open Note
- Not a timed exam
- Passing is 80%



Indiana State  
Department of Health

# Discussion/Questions

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